THE JOURNAL OF SCHOOL HEALTH

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THE AMERICAN SCHOOL HEALTH ASSOCIATION

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THE JOURNAL OF SCHOOL HEALTH

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VOL. XXVIII APRIL, 1958 No. 4

REPORT OF COMMITTEE ON TUBERCULOSIS AMERICAN SCHOOL HEALTH ASSOCIATION*

Since the last report of the Committee, Dr. Marie A. Hinrichs, Editor of the *Journal of School Health,* issued a special edition in December, which contained the 1956 Report of the Committee on Tuberculosis. In this issue also appeared all the papers which were presented at the time of the meeting of the National Tuberculosis Association in New York City on the evening of May 21, 1956. These papers are as follows:

"Another Fruitful Avenue of Tuberculosis"
—W. P. Shepard, M.D., New York City

"Recent Tuberculin Testing Experiences in Iowa"
—Paul C. Williamson, DesMoines, Iowa

"The Tuberculin Test—Man's Powerful Weapon in the Winning of the Final Assault Against the Last Strongholds of Tuberculosis Infection and Disease."
—Robert B. Kerr, M.D., Manchester, N. H.

"A Tuberculin Testing Project in Honolulu"
—Robert H. Marks, M.D., Hawaii

"Progress in School Certification"
—Kathleen B. Jordan, M.D., Granite Falls, Minnesota

The five authors presented a large volume of material on practically all aspects of tuberculosis in schools. Doctor DeWeese sent a copy of this December issue of *The Journal* to the executive Secretary of each Tuberculosis and Health Association in the United States. The later demand for this issue far exceeded the supply.

Your Committee arranged a program which was presented on Sunday evening, May 5, 1957, in Kansas City during the sessions of the National Tuberculosis Association. The following program was presented:

"The Significance of Positive Tuberculin Reactions in Children"
—M. M. Williams, M.D., Superintendent, Minnesota State Sanatorium Ah-Gwah-Ching, Minnesota

"Some Highlights of Illinois Tuberculin Testing Programs"
—E. J. Gross, Assistant Executive Director, Illinois Tuberculosis Association, Springfield, Illinois

"The Problem of Positive Gastric Cultures in School Children"
—Katharine H. K. Hsu, M.D., Pediatrician in Charge, Tuberculosis Division of Jefferson Davis Hospital, Houston, Texas

"The Value of Tuberculin Testing in Younger Age Groups as a Clue in Case-Finding"
—A. A. Pleyte, M.D., Medical Director, Wisconsin Anti-Tuberculosis Association, Milwaukee, Wisconsin

*Presented before the Council, November 12, 1957, Cleveland, Ohio.

All arrangements for this meeting were kindly made by Mr. Walter B. Furbush, Administrative Assistant to the Managing Director, National Tuberculosis Association. Miss Charlotte Leach, Consultant, Health Education, National Tuberculosis Association, kindly assisted in directing the meeting and prepared a fine set of minutes. The meeting was well attended. The papers were extensively discussed by Tom Mulrooney, Minnesota; Mrs. Blanche deKoning, Michigan; Dr. Lloyd Swasey, Arizona; Dr. Helen Dickey, Wisconsin; Dr. Harold Trimble, California; Dr. Robert Kerr, New Hampshire; Mr. James Swomley, North Dakota; Mr. Paul Williamson, Iowa.

A number of requests were made that these papers be published in a special issue of the *Journal of School Health*. Doctor DeWeese and Dr. Hinrichs have arranged for such an issue.

A similar program is being prepared for presentation during the meeting of the National Tuberculosis Association in Philadelphia in the spring of 1958.

Certification of schools continued as the main project of the Committee. Qualifications for certificates remained the same as previously, with the certificate indicating that the award was granted by the American School Health Association and the State Tuberculosis and Health Association.

Arizona joined the list of states certifying schools.

The Arizona subcommittee of the Committee on Tuberculosis of the American School Health Association consists of the following physicians:

Richard O. Flynn, M.D., Chairman, Tempe
O. J. Farness, M.D., Tucson
Harold E. Kosanke, M.D., Tucson
Lloyd K. Swasey, M.D., Phoenix
B. L. Snyder, M.D., Phoenix

Mrs. Helen E. Watkins, Executive Director, Arizona Tuberculosis and Health Association, announced that nine elementary schools in Tempe and one in Buckeye were awarded Class "A" certificates.

Chicago and Suburban Cook County also made arrangements to begin certifying schools. Our subcommittee consists of:

Julius B. Novak, M.D., Chairman, Medical Director, The Tuberculosis Institute of Chicago and Cook County
John B. Hall, M.D., Director, Cook County Department of Public Health, 737 South Wolcott, Chicago 12, Illinois
E. A. Piszczek, M.D., Executive Director, The Suburban Cook County Tuberculosis Sanitarium District, 55th and County Line Road, Hinsdale, Illinois

Maya Unna, M.D., 4 South Stone, LaGrange, Illinois
Irwin A. Smith, M.D., 1141 Church, Northbrook, Illinois

Mr. John Egdorf, Executive Director, Tuberculosis Institute of Chicago and Cook County, stated that over the past several years, at least 10,000 tests have been administered annually, and in more recent years the number in the city and county has exceeded 20,000 annually. In view of the increased emphasis on "selective case finding" brought on to a large degree by recent concern over radiation dangers in the x-ray screening program has brought about a new meaning of the Certification Program. This emphasis has been instrumental in causing suburban Cook County Tuberculosis Sanitarium District to abandon x-raying of high school students as had been done in the city of Chicago two years ago. Increased emphasis is now being given to the tuberculin testing program by using the School Certification Plan as a tool to induce greater coverage with these programs.

In *Illinois,* Mr. E. J. Gross, Assistant Executive Director of the Tuberculosis Association and in charge of the certification program stated that 144 schools had been certified. "I am of the opinion that the fall of 1957 will prove quite fruitful in our certification program."

The Illinois subcommittee consists of:

J. A. Stocker, M.D., Chairman, St. John's Sanatorium, Springfield
George C. Turner, M.D., Oak Forest
Marie A. Hinrichs, M.D., Chicago

Iowa. The subcommittee of the Committee on Tuberculosis of the American School Health Association consists of:

Charles W. Gray, M.D., Chairman, Ottumwa
R. E. Smiley, M.D., Mason City
R. B. Widmer, M.D., Winfield

Paul C. Williamson, Executive Director, Iowa Tuberculosis and Health Association, reported that during the past two years 69,747 students were tested and approximately 3 per cent reacted. During the school year 1955-56, 2,789 personnel members were tested, 19.4 per cent reacted. In 1956-57, of 2,173 tested, 15 per cent reacted. During the two years, 634 schools were certified.

A special statistical report is made for each county conducting a school certification program which is sent to participating schools, county physicians, county associations, executive committees. The first page contains a congratulatory statement followed by brief remarks concerning results with reference to the number of schools receiving certificates of honor. This is followed by two

pages designated as "highlights" with such headings as: 1. What does the statistical summary reveal? .2. What about the age of the students who reacted to the test? 3. How many of the school personnel show a reaction to the test? 4. What happened among the contacts of these reactors? 5. The results. This section is followed by a fine array of tables which clearly show all the schools in the county where testing was done, number of boys and number of girls tested, percentage of reactors, etc., etc. This excellent report affords everyone in the county who desires to read it complete information and provides an accurate record for comparison with subsequent studies.

Mr. Williamson summarized the work as follows:

1. Twenty-two Iowa counties have conducted School Certification Tuberculin Testing programs.

2. Two of those counties conducted county-wide mass tuberculin testing programs for all age groups.

3. Reactor registries are being established to guide the re-examination by x-ray film of all known reactors and converters.

4. Physicians from the 22 county medical societies have participated actively in the programs.

5. The programs have involved over 100,000 families. This means that between three and four hundred thousand individuals have given personal attention to important facts about tuberculosis.

6. Statistically, the information gathered thus far is of great importance for epidemiologic purposes and is forming a foundation for future tuberculosis control measures.

Mr. Williamson said: "Even though good follow-up is attained, there is always a considerable lag or length of time before we can identify newly discovered cases resulting directly from the testing efforts.

In this regard, Dr. Charles W. Gray, who served last year as Chairman of the Iowa Sub-Committee, has published a paper on "Tuberculin Testing in Iowa Schools," which describes the yield resulting from our first year of formal certification. His paper appeared in the Journal-*Lancet*, August, 1957.

"Thus far eight cases of active tuberculosis and three cases of tuberculosis of undetermined activity have been reported, emanating from School Certification Programs in Iowa. These are from the first year of our two years' experience.

Our newest pamphlet, "270,000 Iowans Are Laughing," resulted from our mass county-wide testing of all age groups. It is being widely distributed, especially to audiences viewing the new film, 'Are You Positive?' Every tuberculosis worker should have a copy of this pamphlet. The reader is also referred to an article

by Mr. Williamson entitled, "Exploding the Iowa Myth" published in the Bulletin of the National Tuberculosis Association, April, 1957.

Minnesota. Our subcommittee consists of:

E. A. Meyerding, M.D., Chairman, 614 Portland Avenue, St. Paul
L. S. Jordan, M.D., Granite Falls
S. A. Slater, M.D., Worthington

This Committee's report is so inclusive that it is presented in full.

"Minnesota's Certification of Schools program, sponsored by the American School Health Association, has not only served to stimulate all-out response to tuberculin testing surveys in the schools, but has also made whole communities more aware of the school tuberculosis control program and what it can accomplish for school and community.

"There is a slow but steady increase each year in the number of schools that earn certificates for outstanding participation in Mantoux testing surveys. A total of 532 Minnesota schools qualified for certificates in the 1956-57 testing program. Of that number, close to 300 reported 100 per cent turnout by pupils as well as personnel. Since the Certification program was inaugurated in 1945, a total of 2,919 awards has been given.

"We might point out that 'more than 500 certified schools' represents a larger percentage of all school population in 1956 than it did a dozen years ago. At that time the state had nearly 10,000 schools. Today, as a result of widespread consolidation, the total number of schools in Minnesota is closer to 3,000.

"Top-ranking A and B certificates are the only kinds which have been awarded for several years to Minnesota schools. In order to earn an A rating, a school must report that from 95 to 100 per cent of the pupils in all grades have participated, and that 100 per cent of the school personnel took part in the testing program. To qualify for a B certificate, the participation figure for pupils must be better than 80 per cent and that for personnel, 100 per cent. The term "participation' is used to include those who receive the test plus the previously known reactors, who are not Mantoux tested but are asked to have chest x-ray film examinations.

"Possibly the most ambitious of this year's testing surveys was in Otter Tail County, where nearly 10,000 children were offered the opportunity to receive simple skin check-ups for tuberculosis infection. A total of 9,109 boys and girls joined the line-up,

and 104 schools earned certificates for outstanding participation. Tests were administered by Dr. Kathleen Jordan, Riverside Sanatorium, who also serves as field physician for the Minnesota Tuberculosis and Health Association. County and school nurses organized the survey and deserve a great deal of credit for the fine response. Educational materials and publicity were provided by the State Christmas Seal Association.

"Another area which numbers its certified schools in the hundreds is Riverside Sanatorium district, including Chippewa, Lac Qui Parle, Renville and Yellow Medicine counties. The testing surveys are conducted by Drs. L. S. and Kathleen Jordan. In their district, 84 schools can boast not only 100 per cent participation but also 'not one child in the school tuberculosis-infected.'

"The number of schools qualifying in a year for honor certificates would be doubled, or even tripled, if all schools offered the test to all grades. It is not poor participation which makes it impossible for many schools to meet the requirements. It is the fact that while testing is done regularly, it is limited to selected grades. Wherever possible, the Minnesota Tuberculosis and Health Association is emphasizing the importance of including all grades in Mantoux testing surveys.

"In a small number of schools, a single bus driver, teacher, cook or other member of the personnel is the one deterrent to certification. Every effort is made to impress on public health nurses and school administrators that 100 per cent personnel participation is essential for certification and for a truly effective tuberculosis control program in the school. The Certification program, with its appeal to school pride, has probably done more than any one thing to encourage all school employees to have regular checkups for possible tuberculosis. This project has therefore been an aid in safeguarding children from possible infection by a tuberculous teacher, bus driver or school cook.

"During 1956, in Minnesota, at least 132,000 school pupils and more than 10,000 teachers and school employees in 71 of the state's 87 counties participated in the 'Arms Against Tuberculosis' program.

"Reaction figures indicate that slightly more than three of every 100 school children are harboring in their bodies the germs that can cause active tuberculosis. Back in the 20's when school surveys had their start, there were schools in the state with 50 per cent or more of their pupils infected. It was not unusual to find children ill with tuberculosis, and it was far too common to dis-

cover a teacher, janitor, or other adult in the school community who had active or even far advanced disease.

"Tuberculosis today strikes the old more often than the young. We do not expect to discover active disease in the school age population — but even this past year, several active cases were reported in Minnesota schools. Although many of the 5,600 boys and girls numbered as tuberculin reactors in the year's testing program probably will never break down with active disease, they are the potentially active cases. It is only by educating all reactors to have chest examinations regularly that new breakdowns can be found in time to prevent serious illness and further spread of infection.

"The school testing surveys are more than a hunt for tuberculosis in the school itself, and more than a long-range tuberculosis prevention effort. The school is an index to the community. When no child is tuberculosis-infected, it is fairly safe to assume that the community is practically TB-free. At least, any case which may exist is not in close contact with school-age youngsters. On the other hand, a single newly discovered reactor in the school should lead to an immediate search in the area for the man or woman who is spreading the germs.

"Any hunt for tuberculosis, in school or community, is 'TB prevention' only if everyone participates. The one undetected case can be a menace to everybody. Education has done a great deal toward school all-out participation. The Certification of Schools is another excellent means for interesting pupils, parents, and the school personnel in the program to safeguard all against tuberculosis."

In *Missouri* the subcommittee consists of:

Florence E. MacInnis, M.D., Chairman, 618 Professional Building, Kansas City

E. A. Belden, M.D., Jefferson City

Walter C. Gray, M.D., St. Louis

Dr. Walter C. Gray, Chairman of the St. Louis Subcommittee and Chairman of the Committee on Tuberculosis of the St. Louis Academy of General Practice reported on the tuberculosis program of the Academy in the schools of St. Louis. As of June, 1957, more than 125,000 school children had been tested with usual follow-up. Especial attention must be called to the fact that the work of the St. Louis Academy of General Practice is donated as a public service to the schools.

On being made president-elect of the St. Louis Academy of General Practice, Doctor Gray retired from the chairmanship of our subcommittee this year in favor of Dr. Wilbur A. Mullarkey. The St. Louis subcommittee is now as follows:

Wilbur A. Mullarkey, M.D., Chairman, 8711 St. Charles Road, St. Louis
Eugene Hall, M.D., St. Louis
Paul Parashak, M.D., St. Louis

In *North Dakota,* our subcommittee consists of:

Percy L. Owens, M.D., Chairman, Bismarck Department of Health, Bismarck
Ellis Oster, M.D., Ellendale
J. H. Clark, M.D., Minot

James A. Swomley, Executive Director of the North Dakota Tuberculosis and Health Association, reported that 461 North Dakota schools were awarded certificates during the school year 1956-1957. This brought the grand total of certified schools in that state to 1,554. This involved the testing of 81,289 pupils of whom 1,579 reacted and 5,587 personnel members, of whom 1,079 reacted to the tuberculin test.

As of July 15, 1957, Mr. Swomley resigned to accept the executive directorship of the Connecticut Tuberculosis Association. He had been executive director of the North Dakota Association since 1952 where he made a most outstanding record. Some of his fine accomplishments have been recorded in our previous reports.

On Mr. Swomley's resignation, Mr. Edward L. Sypnieski was named acting executive director of the North Dakota Association and on September 13 he was appointed executive director. Mr. Sypnieski is highly qualified, as he had been a field representative of the North Dakota Association since 1952.

Mr. Swomley had said: "It is my belief that our school certification program has (1) given us a program of health education in the schools second to none, (2) given an inexpensive case-finding method that is particularly valuable to areas of low tuberculosis incidence where other forms of case-finding may no longer be practical, and (3) improved our public relations by putting before the public a tangible program with popular appeal."

In *South Dakota* the subcommittee consists of:

R. G. Mayer, M.D., Chairman, 22½ S. Main, Aberdeen
C. L. Behrens, M.D., Rapid City
H. Russell Brown, M.D., Watertown
Roscoe Dean, M.D., Wessington Springs
N. E. Wessman, M.D., Sioux Falls

Mr. Marvin Whealy, Executive Secretary of the State Tuberculosis and Health Association, reported that the number of certified schools remained at 136.

Dr. R. G. Mayer, Chairman of our subcommittee and Health Officer of Brown County, stated that in Aberdeen and the remainder of the county, the second round of the schools began in January 1957. This second testing in all the schools was to be completed during the school year. He said: "We have found that preparation for the clinics can be accomplished much more easily the second time around and the details, records, conducting the tests, all work out more smoothly."

The program in Brown County had also extended to the testing of the freshman class at Northern State Teachers' College in Aberdeen, as well as prisoners in the city jail.

In June, 1957, Doctor Mayer participated in a panel discussion on "pinpointing our case-finding" at the annual meeting of the South Dakota Tuberculosis and Health Association, where he discussed the certification project. This resulted in more counties becoming interest in tuberculin testing.

In February, 1957, the HEALTH-O-GRAM, official publication of the South Dakota Tuberculosis and Health Association, published an article, "Why a Tuberculin Test?" This included the various points, showing that the tuberculin test is the master key for the solution of the tuberculosis problem.

Montana. The Montana subcommittee is composed of:

John A. Schaeffer, M.D., Chairman, Billings, Montana
John A. Newman, M.D., Butte
L. H. Blattspieler, M.D., Helena
Paul F. Christenson, M.D., Great Falls
John Murphy, M.D., Ekalaka

In the November issue of the VOLUNTEER, official publication of the Montana Tuberculosis Association, in an article entitled, "Seal Sale Provides Focus on TB," it was stated that John Casebolt, Executive Director, announced that the school certification program for skin testing would be launched in the near future, as the forms and literature necessary were already printed. In the same issue there appeared an article by Dr. John A. Schaeffer, Chairman of our subcommittee, entitled "School Certification Program — How and Why." This was a very comprehensive article, explaining all the steps to be taken in the certification of schools. The last paragraph reads: "A widespread uniform program of testing throughout Montana will therefore tell us which children must be given further examination for tuberculosis. It will also enable us to discover additional cases among the contacts of the positive reactors. Furthermore, it will be a means of introducing the sub-

ject of tuberculosis in the educational program. Finally, it will give added information about the magnitude of the tuberculosis problem in the various communities of Montana." This article was accompanied by a picture of a display of supplies to be used in the certification program. This display had been presented before the tuberculosis association's bi-annual Board of Directors meeting and the annual meeting of Montana's practical nurses.

Mr. Casebolt and his staff had prepared an elaborate pack of printed material containing all of the information necessary to conduct a school certification program and various forms to be used in recording and reporting results. This was widely distributed. The Montana Trudeau Society approved the program; and it was decided to launch this project in two counties, one of low and one of high tuberculosis incidence. These were to be pilot studies. On Febrary 5 Mr. Casebolt wrote: "The information and acceptance has spread like wildfire and we find that in addition to our pilot programs, private physicians in the three different Indian reservations as well as public health people in two of the remote areas have ordered materials and have begun the program." He said further, "The program is going ahead with full power. In fact, at times I think that it is getting ahead of our planning for this year." Again, he said, "In one small county in which we are doing a pilot study, Deer Lodge County, where there is an enrollment of approximately 4,000 students, we were successful in getting the cooperation of all physicians in the area, the use of 20 volunteer nurses and an unlimited number of persons in the educational field. I am of the opinion that had it been needed in this small area, we could have called up 2,000 volunteers to assist in this program."

Seven thousand, nine hundred and fifty-nine tests were administered, and during the school year, 1956-57, 33 Class A and 3 Class B certificates were awarded.

Mr. R. M. Alling, Field Consultant, said, "We are afraid to think of the response from the remaining 45 counties if we started pushing. All this is to say that the program has met with wonderful response in Montana, and its success is assured."

At the annual meeting of the Montana Tuberculosis Association, Dr. George E. Trobough presented a paper entitled, "Impressions and Results of School Certification Program of Deer Lodge County, Montana." This contained a step-by-step account of the work. He said, "The two active cases of tuberculosis that were

found to date as a result of this survey in my opinion justified the program as carried out in Anaconda and Deer Lodge County. I do feel that other values were received and are as follows: (1) a means of continued case-finding; (2) to know the reactors in our county; (3) the educational benefit derived both by the schools and parents, as well as the doctors and professional people; (4) the program will set up criteria of control of the disease in Deer Lodge County." He said at present the school certification program through the skin test is and was an excellent one.

Members of Committee on Tuberculosis of the American School Health Association are:

Lloyd B. Dickey, M.D., California
Herman E. Hilleboe, M.D., New York
Sydney Jacobs, M.D., Louisiana
H. D. Lees, M.D., Philadelphia
Esmond R. Long, M.D., Virginia
J. B. Novak, M.D., Illinois
Howard M. Payne, M.D., Washington, D. C.
W. P. Shepard, M.D., New York
David T. Smith, M.D., North Carolina
John B. Towey, M.D., Michigan
James J. Waring, M.D., Colorado
J. A. Myers, M.D., Minnesota, Chairman

* * * * *

MEETING

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RECOMMENDATIONS—EXECUTIVE COMMITTEE —AMERICAN TRUDEAU SOCIETY

The following recommendations were made in a report by the Executive Committee of the American Trudeau Society on *X-Ray Radiation Effects and Protection from Radiation Exposure* as the result of a conference with expert advice held in Chicago on October 8, 1957 at the Del Prado Hotel:

1. Chest x-ray surveys must be continued not only in the field of tuberculosis, but in the detection of cancer, industrial thoracic disease, acute and chronic non-tuberculosis infections, chest tumors, and cardio-vascular abnormalities.

2. Conventional and photofluorographic x-ray units may be used to survey segments of the population which are expected to show a high yield of thoracic disease, but the x-ray machines must be equipped with adequate protective devices.

   a. The purchase of certain protective devices should be made *now* without waiting for the more complete monitoring of the unit. These include proper cones, proper filtering, shielding devices for subject and operator, and exposure controls of automatic nature.

3. Tuberculin testing in infants, children, young adults, prenatals and young diabetics should be developed as a primary guide to tuberculosis contacts and as one case-finding method. X-ray of the chest, for the detection of tuberculosis could then be limited to those with a positive tuberculin test.

4. Reassessment of case-finding programs should be done concerning those segments of the population most deserving of chest x-ray surveys or tuberculin testing.

5. The instruction and training of personnel should include information concerning the protective devices for all types of x-ray units.

6. Education of health workers and the public should be undertaken with a positive program incorporating this new and more optimistic look concerning chest x-ray examination. It should be made known to all concerned that effective steps have been taken to minimize direct and scatter radiation exposure involved in taking chest x-rays. A constructive approach is in order to emphasize the continuing usefulness and the need for early diagnosis and treatment of all forms of pulmonary disease.

7. Members of the American Trudeau Society and Constituent Associations might well assume an active role in assisting in and promoting the training of personnel skilled in radiation protection. Such a program could develop and assume a most important role in assuring the confidence of the public that the leadership of these organizations in the field of thoracic disease carries with it the certainty of minimum radiation exposure and the maximum protection wherever chest x-ray examinations are used in survey and diagnostic work under their sponsorship.

—Submitted by Charlotte Leach, Consultant, Health Education, National Tuberculosis Association.

SOME HIGHLIGHTS OF ILLINOIS TUBERCULIN TESTING PROGRAMS*

E. J. GROSS**

Observations in my short nine years of tuberculosis work lead me to believe that *"we have only begun to fight."* Far in the past of those present here, lie many historical events and discoveries which have brought us up to our present status armed with effective weapons, and a great network of highly qualified organizations to use them. The tuberculin test, perhaps the best tool, has been with us since 1890. I have read a great deal of material in my term about the tuberculin test and as yet, the concrete uniformity of its administration, effectiveness, and results are quite varied.

In our great State of Illinois, I could list variations of tuberculin testing procedures so numerous that it is a wonder we have the good results now present in our files. To mention a few, I should like to say that the cost to local tuberculosis associations for administration runs from free to outrageous per test cost. The injection site runs from the upper forearm to the wrist area. Some patches used are placed on the back at a time from just before basketball practice to a day before a school holiday. Readings run from seeing redness to accurate rule measuring. Equipment used runs from use of multiple syringes and needles, to changing needles, to flaming needles. Pre-education for the recipient runs from nothing to well-informed groups. I believe I could go on, but will let this suffice to make my point. I might say that I am sure these situations are not isolated to Illinois.

Since 1890 — 67 years have elapsed, and this most effective tool and its use have not been boiled down to a precision method so fool-proof that I could pick up the phone, call any co-worker anywhere and compare accurate notes because we would be doing precisely the same procedure in our area. I know there is always healthy disagreement among our professional men and we would be in a fine predicament if this were not true. In spite of this, I would hope that we could soon have a tuberculin testing procedure laid out completely in black and white and sponsored by the American Trudeau Society, American Medical Association, and their affiliates.

*Presented before Committee on Tuberculosis, American School Health Association, Fifty-third Annual Meeting of the National Tuberculosis Association, Kansas City, Missouri, May 5, 1957.

**Assistant Executive Director, Illinois Tuberculosis Association.

Please understand that my observations are strictly from a layman's point of view and I am hoping to stimulate some additional thinking. The heads of large industrial firms such as General Motors Corporation, put their minds together and came up with a neat little booklet which is included with every new car. This booklet gives you their tried and true viewpoint on what is the best way to get optimum performance out of your automobile. It tells you to use premium fuel for their powerful engines. Sure, your car will run on something less satisfactory, but you won't get the best results. Many of our tuberculin testing procedures will likewise not give you the best results if the procedure is not the best. This is true. The engineers at General Motors print some things in that little booklet that will not appear in the glove compartment of next year's model. No doubt, our next year's guide, carefully scrutinized by our doctors, would incorporate some minor changes — but mind you, the basic procedures would remain in tact and those of us out in the community could lean heavily on this little "bible." It is presently difficult to inform new workers in our field about the tuberculin testing procedures because we can't tell them, "one, two, three," what the tried and true procedure is which is backed up by our medical convention. Sixty-seven years seems to be a good well-rounded figure so may I urge that in 1957, something be done about this matter.

Now, I would like to say a few words about that person who could do so much more in the field of tuberculin testing — the family doctor. I would judge that everyone in this room has been to his doctor in the last couple of years at least for a check-up. I would not like to ask how many were routinely tuberculin tested. I talked to my doctor about it, but those of us in the work are so few that it may take another 67 years to instill tuberculin testing in the Doctor's office at that rate. Let's give physicians our new booklet, on standardized tuberculin testing procedures, and make sure they are supplied with fresh tuberculin.

Who should be tested? Is it practical and can it be done? Should it be isolated groups in a community or everyone in the community? These, too, are highly controversial questions. In one Illinois community which I will refer to here, a very decided effort is being made to expand tuberculin testing to its fullest boundaries. I shall try to give you some of the proceedings that have taken place in this community and express some of the results of their efforts. I believe it will point out that their work has not been in vain and shows much promise.

Washington County, Illinois, is a farming community. Its area is 565 square miles, its population 13,700, its largest town has 2400 residents.

The work of its tuberculosis association began in 1942. At first, case-finding efforts were limited to the chest films of contacts. The first skin testing was done in 1942 when high school seniors were patch tested.

In 1946, freshmen were added, because at this time the ultimate goal was set to skin test all county residents, if by no other way, in high schools. (Almost every resident becomes a freshman. Not all freshmen become seniors. Therefore, freshmen were added.) In 1950, members of sophomore and junior classes were added if they had enrolled from other schools and had no record of tuberculin testing.

Now, all high school student cafeteria workers and school employees are tested annually to comply with an Illinois law requiring annual proof of freedom from active tuberculosis. Throughout this time — since 1946 — teachers and other school personnel were also included with student testing.

This is the extent, past or present, of survey tuberculin testing — a term applied to work done by the doctors, away from their offices for groups. (Acceptance of tuberculin tests has been good. At present, two high school students are untested because their father refuses consent. He reports having seen a violent reaction after a Mantoux test.)

In 1953, the first determined effort was made to reach adults who had been in high school before skin tests were offered. Up to, and including 1953, 90% of all skin tests were done in surveys as above defined.

Then it was decided to list the following for regular recipients of the skin test:

1. Contacts of patients
2. All members of a household where a reactor was fund
3. Parents of new babies
4. Returning military personnel
5. Diabetics

And each year, some special group was added. They extended the offer to food-handlers one year, industrial employees another, one year all passengers of a school bus driver, who had been found with active tuberculosis, were re-tested and their parents and siblings were tested. The *present dream* is to offer the skin test to all who had a negative chest film in the 1956 mobile unit x-ray survey.

As before mentioned, in 1952-53, 90% of all their skin tests were in surveys. These other groups are done by the doctors in their offices with the individual going for his test at his convenience. Acceptance is not 100% but the offers have definitely increased adult testing and publicized the value of the tuberculin test.

In 1953-54, 51% of the skin test total was in doctors' offices; in 1954-55, 56%; in 1955-56, 53%; in 1956-57, it is only 42% — which is not the fault of the people or the doctors, but is due to the fact that they had to revote the tuberculosis tax and had not time for much else. All told, they have tested 5,339 (infant to age 80) and found 464 reactors. (About 9% for general population) 137 of these have moved from the county, or have died. 327 are on the present reactor list. 114 or 35% of these got there by survey testing; 213 or 65% by testing by doctors in their offices.

Since office testing reaches many more adults than survey testing, it produces more reactors. The reaction percentage in students is 3% or less — usually 2 or 1, or even lower. For adults, it is around 16%. (For contacts, regardless of age, 38%).

All reactors are offered a large chest x-ray film and are at once told that this is to be the first of annual chest films 'till age 99½.

Acceptance of annual x-ray films is good, but not perfect. Two reactors have refused their first film — one because of religious scruples, 2 are "recalcitrant" since 1946, 1 "recalcitrant" since 1948, 2 since 1950, 1 since 1951, 4 since 1954, 6 since 1955 — the whole lapse is not yet 18 months for this final group and they hope to get them into the fold again.

To prepare high school groups for acceptance and *understanding* of the skin test, 8th graders write themes about "what Alonzo learned about tuberculosis;" grade 9 students "The Tuberculin Test;" grade 10, "The Chest X-ray;" grade 11, "Basic Facts About TB;" and grade 12 students write letters to an imaginary freshman who has TB, telling him what to do, after studying material supplied by the association. Now, survey prospects are approached by letter: "Here is a test you ought to have for your own sake and your family's. Go to your own doctor with the enclosed card, when he returns the card bearing your report — he will be paid by the Tuberculosis Association." There is also an enclosure describing the skin test, explaining its value and purpose, stating that the tuberculin positive individual is the potential TB patient of the

future and needs the "'till age 99½" annual test film. The skin negative individual gets a note of thanks for his cooperation. The reactor gets his first x-ray offered. A year later he is reminded when his next chest film is due, a date is made for him, the report goes to the doctor. A year later it is done over, etc.

Results:

3 active cases were found by the first x-ray film after the tuberculin test.

3 active cases were found by one of the annual x-ray films after the first one.

1 student from their county was found with active advanced TB while in the university. If he had been in their county as a high school student, and had been tested, he would have had an earlier annual x-ray film which would have revealed his activity sooner. As it was, he needed long care and a thorocoplasty.

Advantages:

1. The reactor is more likely than others to have an annual x-ray film.
2. He needs it.
3. When he develops activity, he is a much more receptive individual as far as adequate care and treatment are concerned.
4. The reactor is an above average person as to his attitude toward TB control.
5. He is a "cheaper" patient when he develops activity because he is rarely an advanced case.
6. Found early, his activity has rarely reached the communicable stage.

A few years ago, the Illinois Subcommittee on Tuberculosis, of the American School Health Association, began its program of certification of high schools. Rules and regulations governing this program were set forth and it made mild advances which have picked up momentum in recent years to the point where we now have fairly wide distribution. Again, it was necessary to limit our certification program to the entire high school population because there were very few complete elementary school groups being tested. Perhaps our new guide could make a definite recommendation regarding who should be tested among children. One part of our certification regulations, referred to previously, requiring all school personnel to be tested or x-rayed, was made easier when our new school employee x-ray law went into effect on January 1, 1956. Since all school people are required to show no evidence of tuberculosis, our workers can now place more emphasis on getting 100% participation from the students. We keep working on certification and even though it is far short of what we hope to accomplish, it has been a decided aid in promoting our testing program in the schools. In my opinion, similar certification could also be used for other groups such as food handlers, barbers, beauticians, clubs, civic groups, and etc. Dr. Perkins tells us that near 1/3 of

our population are harboring the bacillus. Wouldn't it be wonderful if we had 50,000,000 records of positive reactors who would check themselves annually to be alert if tuberculosis should strike? How could we put every positive reactor in our card files? There is only one answer — the tuberculin test.

Taken from recorded material of the American Trudeau Society, I quote "The new look in tuberculosis should now be directed toward the arduous control of chronic disabling and relapsing infectious disease rather than toward the more spectacular control of a highly fatal disease. The total number of new cases is now more important than the death rate. The community prevalence of chronic cases of tuberculosis, the new plus the known old cases, whether active or inactive, is also more important than the low death rate. The future of prevention should have three facets: first, the detection of the new and unknown cases; secondly the pursuit of the recently acquired primary infection or the recent tuberculin converter; and thirdly, the follow-up of the unhospitalized patient for the continuation of his proper treatment, for the bacteriological control of his excretions and for the prevention or early detection of relapse. What procedure will play the most important role in carrying out these recommendations? Without a doubt, the need for a uniform tuberculin testing program is spelled out here and now.

JUST TO BE FAIR

Here's a kind word for the TB "bug" for which few of us have very tender love. We call it sneaky and treacherous because it stakes out a claim in human lungs, settles there, and sets up housekeeping — all this so quietly that the owner of the lungs does not know he has these tenants and that they are damaging his property. Yet this same germ has the *decency* to announce its presence before it has caused the first "spot on the lungs" visible by x-ray. In effect, it labels those in whom it lives and announces: "Here is one for whom I may cause trouble some day" by making the tuberculin test of the individual positive. Once we use this test thoroughly enough and keep all reactors under annual x-ray observation, the bacillus of tuberculosis may regret that it is so rash about revealing its presence. And that should be enough of speaking well of a pet enemy!

* * * * *

ERRATUM

Attention is called to an error which appeared in the March issue of the *Journal.* On p. 79, paragraph 3, in Gebhard and Doyle's paper titled HEALTH MUSEUM AT WORK, there appeared the following statement; ". . . By its mere existence it is a memento vitae, not a memento mori, for the more than one hundred thousand people *who pass through it daily, . . .*" The last part of this sentence should have read, ". . . who pass it daily." We deeply regret this error.

THE PROBLEM OF POSITIVE GASTRIC LAVAGE CULTURES IN ELEMENTARY SCHOOL CHILDREN*

KATHARINE H. K. HSU, M.D., F.C.C.P.**

During the past three and one-half years 26 children of elementary school age (6 to 12 years old) were found to have positive gastric lavage cultures for tubercle bacilli at the Houston Children's Tuberculosis Hospital. None of these children have had symptoms or history of tuberculosis. On x-ray film examination only 11 of the 26 children showed parenchymal disease or large hilar nodes. Of the remaining 15, two showed calcifying primary complexes and 13 showed no evidence of tuberculosis. The presence of contagious tuberculosis in healthy looking school children is a challenging problem. The purpose of this paper is to bring this problem to the attention of the school health authorities. Seven cases will be used for illustration.

Case 1 R. R.—A 6-year-old, Mexican boy was referred to the Tuberculosis Clinic because of a positive patch test given as a routine procedure at S. J. Clinic. There had been no illness and he was attending school. He reacted to 1:1000 dilution of original tuberculin (OT) February 12, 1954. The physical examination revealed no abnormality. An x-ray film on February 4, 1954, revealed linear infiltration in the lower zone of the right lung. Gastric cultures taken February 19 and March 12, 1954, were reported negative. Because of persistence of pulmonary infiltration, 3 more gastric cultures were taken in October, 1954 and that of October 22 grew tubercle bacilli. Contact—Unknown.

Case 2 J. L. —. A 10-year-old, Negro girl was referred to the Clinic because of contact with a tuberculous brother. She had no symptom and was attending school. She reacted to a 4+ degree to 0.0001 mg. purified protein derivative (PPD) on January 16, 1956, but there was no abnormal physical finding. An x-ray film taken on January 16, 1957 revealed infiltration in the apex of the right lung and heavy hilar shadow. Gastric cultures taken January 30 and 31, 1957, both grew tubercle bacilli. A urine culture taken January 29 also grew tubercle bacilli. Family contact examina-

*Presented as part of a program arranged by the Committee on Tuberculosis of the American School Health Association, during the Fifty-third Annual Meeting of the National Tuberculosis Association at Kansas City, Missouri on May 5, 1957.

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tions revealed an 18-year-old brother who was found to have pulmonary tuberculosis 2 weeks previously. Three married sisters had 5 young children, 3 of whom had active pulmonary tuberculosis. The other two reacted to tuberculin.

Case 3 M. K. — A 12-year-old, Negro girl, was referred to the Clinic because of contact with tuberculosis. She had no symptom, and was attending school. She did not react to the tuberculin patch test in September, 1955, but had a 4+ reaction to 0.0001 mg. (PPD) on September 18, 1956. Physical examination revealed wheeze and diminished breath sounds over the right interscapular region. An x-ray film taken September 21, 1956, showed evidence of a large left hilar lymph node. Gastric culture taken October 11, 1956, grew tubercle bacilli. Family contact examinations revealed one uncle with pulmonary tuberculosis, who was unhospitalized. All 6 siblings reacted to tuberculin. One baby nephew had active pulmonary tuberculosis.

Case 4 T. R. — A 9-year-old, white boy was referred to the Clinic because of contact with tuberculosis. He had no symptom and was attending school. He did not react to the Mantoux tuberculin test in January, 1955, but was a 4+ reactor to 0.0001 mg. (PPD) on December 28, 1955. The physical examination was negative. An x-ray film on December 30, 1955, showed no definite evidence of pulmonary tuberculosis, but a gastric culture taken on January 23, 1956, grew tubercle bacilli. Contact history revealed father with active pulmonary tuberculosis who had been admitted to a Veterans Administration Hospital in November, 1954. He signed out against medical advice in April, 1955 and has since been on home care under private physician.

Case 5 M. F. — An 11-year-old, Negro girl, was referred to the Clinic because of a positive patch test given as a routine procedure at J. D. Pediatric Clinic. She had no symptom and was attending school. She did not react to tuberculin in September, 1955, but reacted to the tuberculin patch test in August, 1956, and to a 3 + degree to 0.0001 mg. (PPD) in September, 1956. The physical examination was unrevealing. An x-ray film on September 28, 1956, showed no evidence of pulmonary tuberculosis. However, gastric culture taken on November 1, 1956, grew tubercle bacilli, which proved pathogenic to guinea pig. Contact history

revealed a close family friend died recently and the cause of death was thought to be tuberculosis.

Case 6 C. K. — A 10-year-old, white girl, was referred to the Clinic because of contact with tuberculosis. She had no symptom and was attending school. She reacted to a 3 + degree to 0.0001 mg. (PPD) on April 25, 1956. The physical examination revealed no abnormal findings, and an x-ray film on April 25 was clear. A gastric culture taken May 11, 1956, grew tubercle bacilli. Family contact examinations found the mother, with far advanced, pulmonary tuberculosis, diagnosed in April, 1956. All 3 siblings reacted to tuberculin.

Case 7 S. P. — 10-year-old, white boy, was referred to our Clinic because of contact with tuberculosis. He had no symptom, and was attending school. He reacted to a 3 + degree to 0.0001 mg. (PPD) on January 20, 1956. The physical examination revealed slight enlargement of cervical axillary nodes, but was otherwise negative. An x-ray film taken on January 20, 1956, showed the hilar shadows somewhat prominent. A gastric culture taken February 13, 1956, grew tubercle bacilli. Further studies of culture showed serpentine cord formation and positive neutral red reaction. Contact history revealed the father had a diagnosis of pulmonary tuberculosis with cavity in July, 1955. He was under the care of a private physician at home.

Discussion: The above mentioned cases bring up a number of questions which will be discussed as follows:

Should Children With Positive Gastric Lavage Cultures be Considered Contagious Cases of Tuberculosis? In our series, 11 children showed obvious x-ray evidence of pulmonary tuberculosis. There would be no argument as to their being contagious. In the 13 who presented no evidence of tuberculosis in the chest radiographs, the sources of tubercle bacilli was most likely the hilar nodes or possibly the tonsils. In recent years, with the frequent use of bronchoscopic examination, it has been demonstrated that bronchial tuberculosis occurs much more often in primary tuberculosis than had been assumed. The caseous hilar lymph nodes, which are usually adherent to the bronchus, frequently rupture into the bronchial lumen with the discharge of tubercle bacilli through the bronchial fistulae. I believe these children with open tuberculous lesions in the bronchial tree due to draining

hilar nodes should be considered contagious just as children with open tuberculosis lesions on the neck due to draining tuberculous cervical nodes. It is true that children usually swallow their bronchial secretions; therefore, probably keeping the bacilli to themselves; however, when these children cough or sneeze due to a cold or any other cause, it is quite conceivable that they can become spreaders of tubercle bacilli. This fact must not be viewed lightly today because over 95% of the elementary school children in the United States are now tuberculin negative and, therefore, are not immune and are susceptible to tuberculous infection.

Which Children Are Contagious? If we believe that children with open tuberculous lesions as evidenced by positive gastric lavage cultures are contagious, the next question is, how thoroughly should children be examined to detect the contagious cases? Certainly every child with a positive tuberculin reaction should have a chest radiograph and a physical examination. Those with gross evidence of active tuberculosis in the chest or elsewhere in the body must be considered potentially contagious. These children should be removed from school and given active drug therapy. For illustration see Case 1, Case 2 and Case 3.

The greatest challenge is those cases in which the open tuberculosis lesions are hidden, such as hilar nodes, which are usually not visualized in the chest radiograph as illustrated by Case 4, Case 5, Case 6 and Case 7. It is hard to say how far gastric lavage should be carried out among children with primary tuberculosis whose chest radiographs show no gross disease. We feel at least two types of cases deserve special attention; namely, 1. children from tuberculous households and 2. children whose tuberculin reaction converted from negative to positive within one year. This has been our basis for selection of children for gastric lavage culture. Children from tuberculous households are subject to heavy and repeated infection. They are more liable to develop active tuberculous diseases than children who are not so constantly exposed. Recent tuberculin conversion indicates a fresh primary infection, which is still in its active stage when the hilar nodes often perforate the bronchus. These considerations lead us into the problem of family contact examinations and periodic tuberculin testing, which will be discussed presently.

Regarding gastric lavage, it must be mentioned that the success of demonstration of tubercle bacilli depends a great deal upon

the adequacy of the specimen. The lavage must be done soon after the child wakes up in the morning and before the peristaltic movement evacuates the gastric contents into the intestines; therefore, it is not satisfactory to bring children to the clinic for gastric lavage. Adequate specimens can be obtained either by admitting the child to the hospital or by requesting a nurse to go to the child's home early in the morning to do the lavage.

The Need for Family Contact Examinations: Today, in the United States, the tuberculin index in children is reduced to a very low level. In the City of Houston only 2.2 per cent of children under 12 years of age are tuberculin positive. Since children usually get tuberculosis from their adult associates, the tuberculin positive children stand out as danger signals indicating where tuberculosis is being spread. Examination of the family contacts of these children would lead to the discovery of many unsuspected cases of tuberculosis. We have found this approach a very fruitful method of tuberculosis case finding under the present epidemiological situation. (1) It is realized that contact examination is a time-consuming job, but with so few children being tuberculin positive today, it has become feasible. Among the 26 children who showed a positive gastric lavage culture, 16 were household contacts of tuberculosis, 4 had frequent contact with tuberculous relatives and of the remaining 4, the source of infection was not located.

The Importance of Periodic Tuberculin Testing: Periodic tuberculin testing serves two important purposes. It detects fresh primary tuberculosis in children and it points to the presence of contagious tuberculosis in the immediate environment of the infected children. Thus, a periodic tuberculin testing program in the schools will single out the children who need thorough examinations. Fresh tuberculous infections are always active tuberculous infections. These children should be examined from the standpoint of contagiousness. Also, for their protection, prophylactic isoniazid therapy should be seriously considered, (2) (3) Primary tuberculosis occurring during adolescence carries a great risk of developing progressive tuberculous diseases; therefore, periodic tuberculin testing is of special importance in this age group.

Besides the thorough examination of the tuberculin converters the family contacts of these recently infected children must be referred to the Public Health Department. An intensive search should he made among them, not only for the source of the infection, but also for other victims who have been or are being in-

fected by the same source. Thus, a good tuberculin testing program in the schools would prove invaluable to tuberculosis case finding in the community.

Summary: 1. The purpose of this paper is to bring up the challenging problem of contagious tuberculosis among the apparently healthy looking school children with the hope of stimulating more studies on this problem.

2. Every child with a positive tuberculin reaction should have a chest radiograph and a physical examination. Those showing gross signs of active tuberculosis should be removed from the school.

3. A normal chest radiograph does not always preclude contagious tuberculosis in elementary school children.

4. Periodic tuberculin testing and family contact investigation of the tuberculin converters not only help to detect hidden cases of contagious tuberculosis in the school children, but also yield important information vital to tuberculosis case finding in the community.

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NOTICE

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A. O. DeWeese, M.D.,
Executive Secretary

THE VALUE OF TUBERCULIN TESTING IN YOUNGER AGE GROUPS AS A CLUE IN CASE FINDING*

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Wisconsin Anti-Tuberculosis Association

It was exactly thirty years ago, in May, 1927, that the Wisconsin Anti-Tuberculosis Association carried on its first tuberculin testing studies. Sixty-eight boys and 130 girls in three Wisconsin child-bearing institutions — or orphanages, as we called them then — were given vonPirquet tests. In July of the same year, 270 children at the State Public School for Dependent children at Sparta were similarly tested.

Among these 468 children, a reaction rate of 20.5 per cent was found. This was, for the time and place, an almost revolutionary finding, for the generally held opinion among physicians and public health workers was that, as Naegeli reported from autopsies in 1900, "everybody had a little tuberculosis." It was widely believed that reaction rates among children and particularly orphaned children, would be well nigh universal.

There is no record of more tuberculin testing by the Wisconsin Anti-Tuberculosis Association until 1931, when approximately 4,000 children and young adults, mostly in school situations, were tested intradermally with various strengths of old tuberculin. Among these 3,975 individuals, 25.9 per cent reacted.

The Wisconsin Anti-Tuberculosis Association (WATA) did not then have — nor did it have for many years afterward — x-ray or fluoroscopic examining equipment to follow up on reactors. It did, however, make an earnest effort to obtain medical follow-up through health departments and physicians' offices.

It is therefore impossible to report how many cases of active tuberculosis were found among these reactors. But the values of the tuberculin skin test quickly impressed themselves upon the medical staff of the WATA. Writing in the monthly publication of the Association, The CRUSADER, a staff physician, Dr. Florence E. Mac Innis, thus listed the WATA's aims in conducting tuberculin testing programs:

1. To find those who have been infected.
2. To find among the infected those who have tuberculosis disease.
3. To refer those who have tuberculosis disease to the family physician for further observation and study to determine if the disease is active.

Presented before Committee on Tuberculosis, American School Health Association, 53rd Annual Meeting of the National Tuberculosis Association, Kansas City, Missouri, May 5, 1957.

4. To assist in procuring proper care for those ill with tuberculosis.
5. To educate the reactors to the necessity of repeated examinations and observation by their physician for years to come.
6. To aid in formulating individual programs for those reactors who are likely to break down with tuberculosis if they do not lead a well regulated life.
7. To point the way to possible sources of infection. Each member of the family and household of a reactor should be tuberculin tested and if positive, examined, X-rayed and given such other study as is indicated. This, because the disease is frequently spread in deadly forms by individuals with so mild a form that they and their families have never even suspected its existence.
8. To impress upon those who are negative to tuberculin the necessity of re-tests at yearly intervals in order that they may know when infection may have occurred.

It is interesting that no mention is made in this listing of three values of the test widely recognized today: as a tool of differential diagnosis, as a statistical measurement of infection rates — and hence of relative morbidity of various population groups — and as a peg upon which to develop community educational programs.

In closing, Dr. Mac Innis wrote thus:

"This program has just begun. We shall have to repeat and repeat and repeat its aims and accomplishments before its roots become firmly implanted."[1]

That was 23 years ago. Through all these years the Wisconsin Anti-Tuberculosis Association has preached and practiced tuberculin skin testing. Through the rising tide of popularity of the test in the 1930's, the unfashionableness of the test in the 1940's (when mass x-raying was the overwhelming case-finding tool of choice), and now again in the 1950's when the tuberculin test appears to be winning back its friends — through all these 23 years, the WATA has continued to repeat and repeat and repeat the *aims* of the tuberculin skin test.

In recent years it has seemed desirable to the Association to try to evaluate the *accomplishments* of the tuberculin skin test in two areas where they presumably can be measured: in helping to find cases among reactors, and in pointing the way to probable sources of infection.

Four years ago, three members of the staff of the Wisconsin Anti-Tuberculosis Association studied tuberculin testing programs reported to have been carried on through Wisconsin public health nursing services. Questionnaires sent to 65 such departments revealed that 49 nursing services had school tuberculin testing programs during the year 1950 that could properly be included, and that through these 49 services, 45,804 individuals were so test-

1 Mac Innis, Florence E., "Charting the Course," The CRUSADER, March, 1934, pp. 3, 4.

ed. In the report on the study, it was concluded that this total included "approximately three-fourths of all tuberculin testing carried on in the state during the year."[2]

These 45,804 individuals included 9,582 who were adults, or individuals on whom reaction or age classification was unknown. Omitting them, there were something over 36,000 individuals of ages 1 to 18 on whom reaction rates could be computed.

During the past winter, a similar study of school groups was done for the year 1955. Through the Tuberculosis Division of the Wisconsin State Board of Health, inquiries were made of public health nursing services all over the state. These inquiries revealed that some 38,270 tuberculin skin tests were known to have been given through public health nursing services during 1955. Again omitting adults and individuals of unknown age, we have 32,975 persons of ages 1 to 19 who are known to have been tested.

Doubtless, some programs were missed in this study also. There are also certain differences between the two surveys; in the first, for example, the top age included was 18 years, in the second, 19 years.[3]

But a comparison of findings in the two surveys provides some interesting and perhaps significant observations.

The first observation may be made from figure 1.

In spite of all the "repeat and repeat and repeat" in Wisconsin over the last 25 years on the value of the Tuberculin skin test, we have evidence that only one child in 27 in Wisconsin appears to have had a tuberculin test in 1950. The ratio had not risen by 1955. In fact, considering the marked proportional increase in the "under 19" age group, with the post-war boom in babies, it appears to have declined to about one in 37. Even if we arbitrarily assume that these studies include about 75 per cent of persons tested, we may surmise that only one child in 19 was tested in 1950 and one in 26 in 1955.

The second observation may be made from figure 2.

Among the 36,222 persons tested in 1950, who are known to have been 18 or under, there were 1,786 (5.0 per cent) reactors. Among the 32,975 individuals of 19 or under known to have been tested in 1955, there were 849 (2.6 per cent) reactors.

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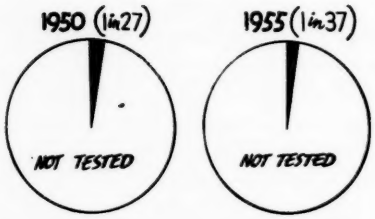
2 Pleyte, A.A., M.D., and Kerwin, Doris, R.N., and Sternitzky, Duane, "The Value of Tuberculin Skin Testing as a Case-Finding Procedure," The Journal-Lancet, April, 1953, pp. 130-132.

3 From unpublished data furnished Wisconsin Anti-Tuberculosis Association by Mrs. Agnes Jensen, R.N., Public Health Nursing Consultant in Tuberculosis, Wisconsin State Board of Health. The authors are much indebted to Mrs. Jensen and to the Public Health Nursing Services of Wisconsin, for the information and statistics upon which much of this paper is based.



POPULATION of WISCONSIN, 19 and UNDER, KNOWN TO HAVE BEEN TUBERCULIN TESTED
Fig. 1

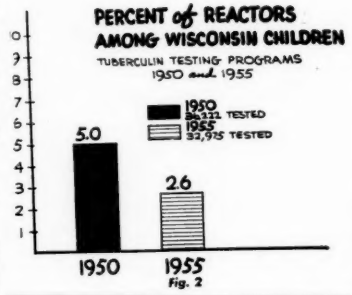


Fig. 2

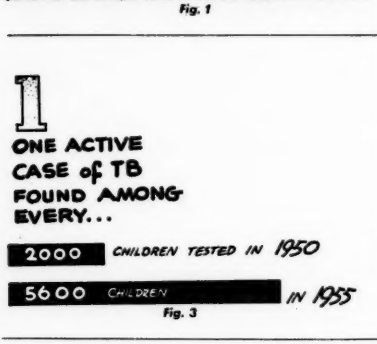
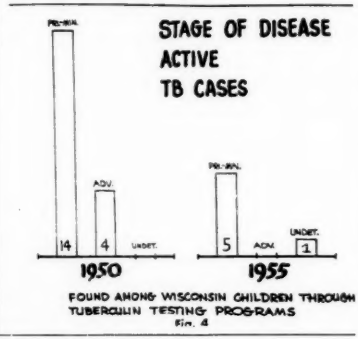


Fig. 3



FOUND AMONG WISCONSIN CHILDREN THROUGH TUBERCULIN TESTING PROGRAMS
Fig. 4

Since the age distribution in the two surveys was roughly comparable, there appears, then, to have been a substantial drop in the infection rate from 1950 to 1955.

This marked drop in reaction rates is corroborated in a sense in figure 3, which gives finding of active disease for the two years.

Among the 36,222 children known to have been tested in 1950, there were 18 active cases found. Among the 32,975 tested during 1955, there were 6 active cases found. (Actually, one of these cases may have been a false alarm.) Or, as we see from figure 3, there was one active case found among 2,000 children tested in 1950; one case among 5,600 children tested during 1955.

There thus appears to be a tremendous drop in prevalence of active tuberculosis among children of school and pre-school age. Yet too much should not be read into these figures. For one thing, the completeness of follow-up is unknown; 1955 was a year when public health nurses in Wisconsin were concentrating on polio vaccination programs, and tuberculosis control may have had to be by-passed to some extent. For another, the numbers involved are small.

To illustrate how a single situation may radically alter the picture, we can jump ahead to 1956, when an actively tuberculous teacher taught out her school year in a rural district in southern Wisconsin because her disease was unrecognized until she returned home to another county for the summer vacation. Fast and effective work by the public health service of the first county, when informed of the teacher's disease, led to the discovery that 30 of the 33 children in her school were tuberculin positive. Six children of school age, or of pre-school age in the home where the teacher boarded, were subsequently admitted to a Wisconsin sanatorium.

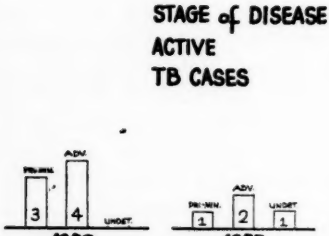
Had this particular school been tuberculin tested late in 1955 rather than in the summer of 1956, markedly higher findings for the year might have been reported.

To see the findings by stage of disease among the cases reported for 1950 and 1955, we may compare them in figure 4. In the former group of 18 cases, 14 were in the minimal or primary stages; only 4 were moderately advanced and none was far advanced. In the latter group of 6 cases, five were in the primary or minimal stages, one case was of undetermined degree, and there were no advanced cases.

The conclusion which might be drawn from these figures is that tuberculin testing uncovers but few cases among younger age groups, and that its use as a case-finding tool in this population is therefore economically unjustified. This, however, would be like adding two and two together and getting five.

It is quite true that tuberculin testing programs uncover few cases among school children. The reason is simple: there are relatively few cases of TB to be found among school children. But if we agree that finding these cases among school children — and finding them early — is highly desirable, then we have two alternatives: tuberculin testing all school children and x-raying the reactors, or by-passing the tuberculin test and x-raying all school children.

Today, with continually lowering infection rates and the costliness of x-raying large population groups, we can hardly justify the latter procedure on a case discovery cost basis. While we can still defend x-raying of susceptible or vulnerable groups, it is becoming more difficult to vindicate the idea of chest films for all. It seems more practical to educate and skin test. We can then go on more economically with other phases of our case discovery program, including chest films, search for tubercle bacilli, etc. Early



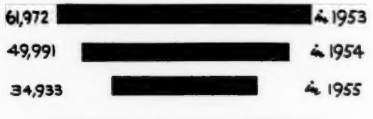
FOUND AMONG ASSOCIATES OF REACTORS in TUBERCULIN TESTING PROGRAMS AMONG WISCONSIN CHILDREN

Fig. 5

Age Group	No. Reactors	No. Contacts Examined	No. Contacts Examined Per Reactor
Under 1 year	3	16	5.3
1-4	10	42	4.2
5-9	141	243	1.7
10-14	250	278	1.1
15-19	237	203	.9

CONTACTS EXAMINED, TUBERCULIN TESTING PROGRAMS AMONG WISCONSIN CHILDREN, 1955

Fig. 6



WISCONSIN PERSONS TUBERCULIN TESTED IN YEARS 1953-55 ACCORDING TO STATE BOARD OF HEALTH

Fig. 7

treatment and ultimate control of tuberculosis can thus be accomplished most economically.

We may now go on to a second value of tuberculin skin testing programs among younger age groups — this time not as a clue in uncovering TB among the children themselves, but as a clue in uncovering TB among the adults in their homes.

Figure 5 shows findings among associates to reactors. In 1950 there were 7 active cases reported among these associates, four of whom were in an advanced stage. In 1955, there were four active cases reported among these associates, two of whom were advanced.

No conclusions should be drawn from these meager findings except the pretty obvious one that cases found among associates of reactors are likely to be more advanced than the cases seeded by them among their children or child associates.

The reason for this caution is brought out in figure 6. Here we see the number of reactors and the number of contacts examined per 5-year age group in 21 nursing services reporting on

this matter for 1955. There is a sharp plunge downward in the ratio of contacts examined to reactors as we move from reactors who were infants to reactors who are of grade and high school age. Certainly the number of family associates does not decrease so rapidly. It would appear that parents and other associates of older child reactors are not as easily persuaded to be x-rayed.

It thus appears that the second value of the tuberculin test as a clue in case-finding is not nearly as well grasped as the first.

Figure 7 brings out in capsule form, the conclusion which is suggested by several of the preceding figures. There was apparently a marked drop in the number of tuberculin tests carried on in organized programs from 1953 to 1954, and another marked drop from 1955 to 1956.

Reference was made early in this paper to the fact that the differential diagnosis, social research and educational values of the tuberculin skin test were not clearly seen in the early years of tuberculin testing programs. Later in the paper, reference was made to an episode in southern Wisconsin in the summer of 1956 when 30 of 33 school children exposed to an actively tuberculous teacher were found to be tuberculin reactors and how at least six of the school and pre-school children exposed to her have since entered a Wisconsin sanatorium.

This is not the time or place to discuss the social research or differential diagnosis values of the tuberculin skin test. With respect to the first, it becomes increasingly clear that there is a wide variation in tuberculin reaction rates in specific groups of the population, and that these reaction rates point to higher morbidity rates. With respect to the second, it is also increasingly clear that the tuberculin skin test is an extremely useful tool in deciding whether suspicious x-ray or laboratory findings are due to tuberculosis; thus, a negative response to the test washes out the significance of many symptoms suggesting tuberculosis.

But a brief review may be in order of the educational values of the tuberculin skin test, particularly as they were exemplified in Wisconsin during the past year by the so-called "Fitchburg Case."

It broke in the July 31st issue of Wisconsin's largest daily. Other papers about the state printed similar stories. Within a few weeks a tremendous chain of public reaction set in. Strong editorials demanded protection of school children. School systems set up voluntary programs for required x-raying of school employes.

County health committees and county boards of supervisors called upon their local members in the Wisconsin Legislature to introduce legislation for mandatory health examinations of school employes. The Wisconsin County Boards Association, a group with tremendous political influence, adopted quite voluntarily at its state meeting, a few weeks later, a call for legislation specifying "that all personnel connected with the schools be required to submit to a physical examination and a chest x-ray film or such other test that may be required for the determination of whether or not such person is an active tuberculosis case."

The Wisconsin Congress of Parents and Teachers took similar action at its state meeting. So, too, did the Wisconsin Welfare Council. So, too, did the Division of Tuberculosis and Diseases of the Chest of the State Medical Society.

Instead of one bill, five bills were introduced, and with many sponsors. Working closely together, the State Medical Society, State Board of Health, and the Wisconsin Anti-Tuberculosis Association have ironed out minor differences in points of view. As this paper is written, there seems good probability that a strong and wise bill for protection of school children against infection from school employes with unrecognized tuberculosis will be enacted into law.

A year ago, no one dreamed of such a development. Such is the power of public education arising from the dramatic consequences of a single schoolroom situation.

Now what do these statistics and comments add up to?

First, it would appear that we cannot build a good case for school tuberculin testing programs on the basis alone of active cases among the school populations studied. The "yield" is very low compared with case-finding programs in certain other groups in the population — and appears to be declining rapidly.

Second, cases found through such studies, however, are early. They are also found more economically than through general x-raying of school populations.

Third, follow-up of family associates of child reactors, while an excellent idea in theory, is as yet spotty in practice.

Fourth, just as 25 years ago, we must "repeat and repeat and repeat" if tuberculin testing programs are to go forward in quantity and quality. Without such eternal emphasis and re-emphasis, they are likely to stagnate.

Fifth, the educational impact of the tuberculin skin test, and of cases found through it, may in the end be the greatest value of the test. The skin test, like the chest x-ray film and other screening tests, must be valued by the part it plays in the total tuberculosis control program — not by the dollar sign. In the words of a famous victim of tuberculosis, Robert Louis Stevenson, writing in one of his delightful books of travel, "The most beautiful adventures are not always those we go to seek."

* * * * *

DISCUSSION

Tom Mulrooney of the Minnesota Tuberculosis and Health Association stated: "We in Minnesota has been certifying schools through the American School Health Association since 1945.

"We find that the school certification program is an excellent case-finding method and also does a wonderful job as far as education is concerned. Up to the moment, approximately 3,000 schools have received certificates. From a case-finding standpoint, if a child does not react to the tuberculin test, for instance this year, and then the following year the child is again tested and this time there is a reaction, we know definitely that sometime between the last test and now the child has come in contact with someone who has active tuberculosis. It is very essential then to try to trace the source of infection, and oftimes that source of infection proves to be someone in close proximity in the home, the mother, the father, the grandmother, the grandfather, and it sets up a wonderful way to weed out the source of infection.

"From an educational standpoint, the child who has a tuberculin test year after year and does not react, becomes conscious of tuberculosis and it teaches him to realize that tuberculosis is a dangerous contagious disease and there is a strong tendency for the child to watch and protect himself. If the child is a reactor, by the same token, he becomes conscious of the dangers of tuberculosis and is taught to take care of himself or herself, to get a chest x-ray film at least once a year and it makes him generally conscious of the disease, tuberculosis. It also helps to instill a sense of gratitude toward the Christmas Seal organization and as the child grows into adulthood the chances are that he or she will continue to buy Christmas Seals.

"The school certification program also works well in educating the superintendent, the school authorities, the teachers, the school personnel, bus drivers, etc., and by the same token, instills

into these people the importance of taking care of oneself with regard to tuberculosis. The schools are always very pleased to receive certificates. It sets up a sort of competitive spirit on the part of the various schools, and in this way makes them more health conscious and more willing to take the necessary steps in doing preventive tuberculosis work."

Paul C. Williamson, Executive Director, Iowa Tuberculosis and Health Association: "Tuberculin testing activity in Iowa has shown remarkable strides in only a short period of time. The first county-wide mass testing program for all age groups was conducted in Jones County in 1954. More than 70 per cent of the entire population (19,401) were tested and 10.2 per cent were found to be reactors. This means that over 1900 people in Jones County comprise that segment of the population from which new cases will develop.

"Our second county-wide mass tuberculin testing program is being conducted this year in Dallas County, population 23,661 and will be reported upon later.

"The School Certification program in cooperation with the Tuberculosis Committee of the American School Health Association began to gather momentum in the 1955-56 school year, so we have now had only two years' experience in this type of program. We believe, however, that the school program is showing unusually good response by school boards, school personnel, parents, students, and county medical societies.

"In the two school years a total of 744 schools have conducted school certification programs. A total of 74,747 students were tested. There were 2,246 reactors, giving an average of 3 per cent

"Records show that 11,548 students and 470 personnel were tested in programs other than school certification.

"School personnel tested in school certification programs numbered 4,962 with 867 reactors showing an average of 17.2 per cent.

"The existing plan provides for x-raying all reactors promptly, regardless of age and in the case of students re-examination by x-ray within six months to a year. Subsequent x-raying of student reactors will be done as each one reaches grades 5, 9, and 12. After age 18 each reactor is advised to have an annual chest x-ray film as is recommended for adult reactors.

"All student and personnel non-reactors are to be retested with tuberclin every three years. Follow-through in families of student reactors is a necessary part of a complete program and in most instances is being well conducted.

"The use of mechanical tabulation for statistical information is a requirement in order that accumulative and comparable information may be gathered and studied.

"Thus far the number of new tuberculosis cases discovered as the direct result of our tuberculin testing efforts have been few. This factor leads to some discouragement on the part of some paid workers and volunteers who think this type of program requires too much effort for the yield. We are endeavoring, however, to impart the philosophy of the testing program as one of long range nature and one in which the rewards of our immediate efforts will be realized in the years ahead.

The plan, of course, is to administer the tuberculin test to all persons regardless of age, promptly x-ray the reactors, examine those with suspicious shadow-casting disease and treat those proved to have clinical tuberculosis. All adult reactors who have clear x-ray films are to be re-examined by x-ray annually. All non-reactors are to be re-tested with tuberculin periodically. There is little doubt that such a program will eventually provide a great impact on tuberculosis and constitutes a refinement of tuberculosis control procedures.

"In the early organizational and administrative stages the program does seem to be overwhelming and with little yield. However, as the reactors are screened from the population and registries are established, the subsequent program will be a great deal easier to handle numerically and the results of earlier efforts will inevitably be more gratifying.

"Thus far our experience has demonstrated the far-reaching educational values resulting from tuberculin testing programs. Our organizational pattern involves physicians, nurses, school personnel, students, parents, and volunteer workers. In fact, the Public Information and Health Education Aspects reach the entire community.

"No one can fail to recognize that such organization for the proper conduct, follow-up and summarization of results involves many people and organizations. All of these people, including those tested, become familiar with the basically important facts about tuberculosis. They are personally involved in the program one way or another and have a learning experience through doing.

Of particular note, physician interpretations are preferable in Iowa by reason of agreement between medical societies, state department of health and TB associations. In following this plan

more physicians become actively engaged in the tuberculosis program than in any other tuberculous association case-finding activity and we welcome every opportunity to extend our active and cooperative working relationships with members of the medical profession. It is they who bear the responsibility for directing the future approaches to tuberculosis control."

* * * * *

Remarks by the Chairman: The speakers tonight have brought out the most fundamental methods of tuberculosis control ever employed anywhere in the world. They have shown that the characteristic tuberculin reaction indicates the presence of tuberculosis in the reactor's body. They have pointed out that the incidence of tuberculin reactors in this country among school children and school personnel has become so low that the only economically sound practice consists of finding those who harbor tubercle bacilli, examine them promptly and periodically thereafter as long as they live.

To spend time, effort and funds on persons who do not react to the tuberculin test is futile. More than a quarter of a century ago it became an established fact that only tuberculin reactors developed clinical disease. The fact that the majority of school children found to react to tuberculin do not at the moment have significant progressive lesions must not be allowed to deceive workers. It is these reactors together with those who subsequently become reactors in whom the clinical cases of tuberculosis of the future must be harvested. Harvesting must be done at the proper time lest the crop becomes overripe with loss of the individual's health and wide dissemination of tubercle bacilli, thus increasing the future problem manifold.

Non-reactors must be retested with tuberculin periodically as has been so well brought out by our speakers. Only by this procedure are recently infected persons promptly discovered. The tuberculin test reveals the presence of tubercle bacilli in the human body within approximately six weeks after they have invaded. This is far earlier than all other phases of examination, including x-ray film, are of avail.

Recent tuberculin conversion means recent contact with contagious cases which when sought can often be found.

We have never had a method of curing tuberculosis in the sense of destroying all tubercle bacilli; we may now be in the dawn of the day when tuberculosis can be cured by drugs as readily as

infections with pneumococci, gonoccci, streptococci, etc., are now cured by chemotherapy. Already recent convertors are being treated with anti-tuberculosis drugs as practiced by Dr. Hsu and many others. To date these drugs have been found only to suppress tubercle bacilli, but any day one or more drugs may be found which will completely destroy them. If drug treatment is to cure tuberculosis, it must be administered promptly after the invasion of tubercle bacilli occurs, while the lesions are still small and vascular. Periodic tuberculin testing is our only method of detecting the presence of such lesions. As times passes, these areas of disease lose their blood supply after which anti-tuberculosis drugs cannot reach the bacilli and therefore can be of no avail as far as complete disinfection of the body is concerned. Hence the importance of periodic testing of all non-reactors.

Testing in schools must include as near 100 per cent of children as possible. Cases have been reported of the high school girl or boy being absent on the day of test, but developing contagious tuberculosis and infecting most of their classmates before the next regular testing period arrives. Dr. Pleyte cited a case of a teacher who was not tested with tuberculin but infected 30 of the 33 children whom she taught. Similar cases have been reported of bus drivers, cooks, and other personnel members having contagious but undetected tuberculosis, infecting large numbers of children and other personnel members.

I have not been able to understand a procedure that now seems to be in fairly general practice which consists of testing only children in certain grades, such as grades 1, 3, 5, 8 and 12 leaving the remaining seven grades untested. This is less than half of a satisfactory program. Members of the committee on tuberculosis of the American School Health Association took all such procedures into consideration in determining satisfactory qualifications for certification of schools but regarded them inadequate.

Decision anywhere to embark upon such an inadequate program can hardly be due to volume of work required, inasmuch as an experienced nurse or physician can easily administer 300 tests per hour. The old adage "Anything that is worth doing, is worth doing well" is appropriate for tuberculosis control programs in school.

Certification of schools has now been employed for 11 years and thousands of well-earned certificates are now on display in schools of several states. Nothing has been found so valuable in

stimulating interest and activity leading to eradication of tuberculosis. The faster it is extended to include all the schools of this country, the nearer the tuberculosis eradication goal will become.

* * * * *

REQUEST FOR NOMINATIONS

According to the Operating Code of the Nominating Committee of the ASHA, it is the duty of the Chairman of the Committee to request an announcement in the April issue of the *Journal.* This announcement is to invite any member of the Association to suggest names of persons they would like to see nominated to the various vacancies.

We shall be nominating this year a vice-president in charge of program and a vice-president in charge of membership and five members of the Governing Council whose terms expire in 1958.

—Fred V. Hein, Chairman, Nominating Committee.

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